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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,893	10/17/2005	Natsuhiko Mizutani	00684.103076	7796

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EXAMINER	
LIU, MICHAEL	
ART UNIT	PAPER NUMBER
2851	
MAIL DATE	DELIVERY MODE
07/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

TH

Office Action Summary	Application No.	Applicant(s)	
	10/529,893	MIZUTANI, NATSUHIKO	
	Examiner	Art Unit	
	Michael Liu	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,7,8 and 11* is/are rejected.

7)☒ Claim(s) *2,3,5,6,9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20060721, 20050503*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because of legal language. The word "disclose" should be avoided . Correction is required. See MPEP § 608.01(b).

Claim Objections

2. Claim 8 is objected to because of the following informalities: "filed" is believed to be a typo of the correct word --field--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 4, 8, 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuroda et al (6,171,730).

Re claim 1: Kuroda et al discloses a near-field exposure method [claim 24] wherein a pressure difference [col 5, lines 26-30] is applied to between a front face and a rear face of an elastically deformable [col 4, line 54] exposure mask 106 to cause deformation of the exposure mask in accordance with a substrate 108 to be exposed and to cause the exposure mask surface to follow a surface irregularity state [col 4, line 47] of the substrate so that these surfaces are closely contacted [col 4, lines 63-65] to each other, for exposure based on near field light, characterized in that:

the pressure difference applied to between the front and rear faces of the exposure mask is set at a predetermined pressure difference corresponding to surface roughness of the substrate to be exposed [col 5, lines 5-9].

Re claim 4: Kuroda et al discloses a near-field exposure apparatus [Fig 1A] for performing an exposure on the basis of near field light [col 4, lines 7-10], said apparatus comprising means for holding [see Fig 1A] a thin film mask 106, a pressure container 105 capable of applying a pressure to apply a pressure difference [col 5, lines 26-30] to between a front face and a rear face of the thin film mask, control means [valve 109] for controlling the pressure difference, a stage 111 for holding a substrate 108 to be exposed, and a light source 101, characterized in that: said control means is operable to set the pressure difference at a predetermined pressure difference corresponding to surface roughness of the substrate to be exposed [col 4, line 66 - col 5, line 9].

Re claim 8: Kuroda et al discloses a near-field exposure mask [see Fig 2B] to be used in an exposure process based on near field light [col 4, lines 7-10] while a pressure difference [col 5, lines 26-30] is applied to between a front face and a rear face

of an elastically deformable [col 5, line 53] exposure mask 201-202 to cause deformation in accordance with a substrate 108 to be exposed and to cause the mask to follow a surface irregularity state [col 5, lines 59-60] of the substrate so that these surfaces are closely contacted [col 5, lines 57-58] to each other, wherein the exposure mask comprises a transparent thin-film mask base material 201 and a light blocking film 202 formed thereon, characterized in that:

the thin-film mask base material has a predetermined thickness [col 5, lines 45-46] determined on the basis of surface roughness [col 5, lines 56-65] of the substrate to be exposed and a pressure difference to be applied to between the front and rear faces of the mask during the exposure.

Re claim 11: Kuroda et al discloses a device manufacturing method, comprising:

a preparing step for preparing a substrate 108 for device production [col 2, lines 23-24: wafer prepared with desired thickness];

an applying step [col 3, line 58] for applying a photosensitive resist 107 for exposure, to the substrate to thereby provide a substrate to be exposed;

an exposure [col 4, lines 7-10] wherein a pressure difference [col 5, lines 26-30] is applied to between a front face and a rear face of an elastically deformable [col 4, line 54] exposure mask 106 to cause deformation of the exposure mask relative to the substrate to be exposed and to cause the exposure mask surface to follow the surface irregularity state [col 4, line 47] of the substrate to be exposed, so that these surfaces are closely contacted [col 4, lines 63-65] to each other for exposure based on near field

light, and wherein the pressure difference to be applied to between the front and rear faces of the exposure mask for the exposure is set at a predetermined pressure difference corresponding to surface roughness of the substrate to be exposed [col 5, lines 5-9];

a developing and etching step for performing development and etching to the substrate having been exposed [col 4, line 37]; and

a process step for performing a predetermined process to the substrate in accordance with a device to be produced, whereby a device is produced. [It is inherent to follow the fabrication steps to the finish to yield a device.]

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuroda et al (6,171,730) in view of Kubo (4,904,557). Kuroda et al discloses an apparatus according to Claim 4, but does not teach measuring means to measure surface coarseness.

Kubo teaches measuring means [Universal Surface Tester] for measuring surface roughness of a substrate 1 [col 8, lines 24-25].

At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use the measuring means of Kubo in the invention of Kuroda

et al, for the purpose of determining surface roughness to more precisely control the pressure to induce contact between the mask surface and the surface of the resist/substrate.

Allowable Subject Matter

7. Claims 2, 3, 5, 6, 9, 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Re claims 2, 3, 5, 6: There is no prior art that discloses, in combination with the claimed limitations, the equation:

$$P = P_m + E\frac{16hw(4h^2 + (7-\nu)w^2)}{3a^4(1-\nu)}$$

Re claims 9, 10: There is no prior art that discloses, in combination with the claimed limitations, the thickness equations:

$$w(a, h, \Delta P) = \frac{4h^2}{7-\nu}\frac{1}{[R(a, h, \Delta P)]^{1/3}} + \frac{[R(a, h, \Delta P)]^{1/3}}{3}$$

$$R(a, h, \Delta P) = \frac{1-\nu}{7-\nu}\frac{81a^4\Delta P}{32hE} + \sqrt{1728h^6 + \left(\frac{1-\nu}{7-\nu}\frac{81a^4\Delta P}{32hE}\right)^2}$$

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Liu whose telephone number is 571-272-9019. The examiner can normally be reached on Monday through Friday 9 am - 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on 571-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael Liu
Examiner
Art Unit 2851

ML 20070629

DIANE LEE
SUPERVISORY PATENT EXAMINER